AMENDMENTS TO THE CLAIMS

The following Listing of Claims, with cancellation of previously withdrawn claims 1-6, 10-15 and 19-22, amendment to claim 16, and addition of new claims 23-31 will replace all prior versions, and listings, of claims in the application. ***No new matter is introduced as a result of the following claim amendments.***

Listing of Claims:

1-6 (Cancelled).

7 (Previously Presented). A system for computing a network code, comprising:

a network having a sender node, one or more interior nodes, and one or more receiver nodes, each node having one or more edges connecting to one or more interior nodes in the network;

means for computing a set of linear combination coefficients for each edge entering each node, each set of linear combination coefficients representing an encoding vector for each edge for encoding symbols transmitted along each corresponding edge;

wherein each symbol provides a symbolic representation of one or more encoded bits of data, and wherein each symbol belongs to a finite library of symbols;

means for computing a decoding vector for each edge exiting each interior network node from the linear combination coefficients of the edges entering each node, wherein each decoding vector is used for decoding symbols transmitted along each corresponding edge;

means for computing decoding matrices for each receiver node of the network from the decoding vectors; and

means for constructing a network code for at least a portion of the network, including the sender node, each interior node, and one or more of the receiver nodes, from the corresponding linear combination coefficients, the corresponding decoding vectors and the corresponding decoding matrices.

8 (Previously Presented). The system of claim 7 further comprising means for allowing each receiver node to use a corresponding one of the decoding matrices to decode data transmitted from the sender node, to the receiver node across a plurality of edges of the network between the sender node and the receiver node.

9 (Previously Presented). The system of claim 7 wherein computing the linear combination coefficients further includes means for ensuring that the encoding vectors for the symbols transmitted across edges on a cut between the sender and each receiver are full rank, such that the rank of each encoding vector is the same as the smallest dimension of that vector.

10-15 (Cancelled).

16 (Currently Amended). A computer-implemented process, including computer executable instructions stored on a physical computer-readable medium, for computing a network code for a network including at least one sender, a plurality of internal nodes and at least one receiver, comprising the steps of ~~using a computing device to~~:

computing ~~compute~~ a set of one or more linear combination coefficients for each interior network node and the at least one sender, wherein each set of linear combination coefficients represents a corresponding encoding vector for encoding symbols exiting a corresponding one of the sender and the internal nodes;

computing ~~compute~~ decoding vectors for symbols exiting each interior network node from the linear combination coefficients corresponding to each interior network node;

computing ~~compute~~ decoding matrices for each receiver from the decoding vectors of all internal nodes of the network; and

constructing ~~construct~~ a network code from the linear combination coefficients, the decoding vectors and the decoding matrices.

17 (Previously Presented). The computer-implemented process of claim 16 further comprising allowing each receiver to use a corresponding one of the decoding matrices to decode data transmitted across a path through one or more of the interior nodes between the at least one sender and the at least one receiver.

18 (Previously Presented). The computer-implemented process of claim 16 wherein computing the linear combination coefficients further includes ensuring that the encoding vectors for symbols transmitted across edges on a cut between the at least one sender and each receiver are full rank, such that the rank of each encoding vector is the same as the smallest dimension of that vector.

19-22 (Cancelled).

23 (New). The system of claim 7 wherein a size of the finite library of symbols is independent of the rate of a rate of computed flows between the network nodes.

24 (New). The system of claim 7 further comprising an initialization stage performed prior to computing the set of linear combination coefficients, wherein a representation of the network is reduced to a network with edges between interior nodes having unit capacities by replacing each edge having a capacity c with c edges having unit capacity.

25 (New). The system of claim 24 wherein the initialization stage further comprises:

a determination of whether each edge having unit capacity is within flows computed between the sender node and the receiver nodes; and

topologically ordering any edges within the computed flows from the sender node to the one or more receiver nodes.

26 (New). The system of claim 25 wherein the topologically ordered edges are used for computing the sets of linear combination coefficients representing each encoding vector.

27 (New). The system of claim 25 wherein the topologically ordered edges are used for computing the decoding matrices.

28 (New). The computer-implemented process of claim 16 further comprising an initialization stage performed prior to computing the set of linear combination coefficients, wherein a representation of the network is reduced to a network with edges between

interior nodes having unit capacities by replacing each edge having a capacity c with c edges having unit capacity.

29 (New). The computer-implemented process of claim 28 wherein the initialization stage further comprises:

a determination of whether each edge having unit capacity is within flows computed between the at least one sender and the at least one receiver; and

topologically ordering any edges within the computed flows from the at least one sender to the at least one receiver.

30 (New). The computer-implemented process of claim 29 wherein the topologically ordered edges are used for computing the sets of linear combination coefficients representing each encoding vector.

31 (New). The computer-implemented process of claim 29 wherein the topologically ordered edges are used for computing the decoding matrices.